Saskatchewan Agriculture, Food and Rural Revitalization

ADF

AGRICULTURE DEVELOPMENT FUND

FINAL REPORT

20010055

FLAX VARIETIES FOR ORGANIC FARMING PRODUCTION

Funded by:
The Agriculture Development Fund

January 2003
Prepared by: University of Saskatchewan

103-04308/

Flax Varieties for Organic Farming Production

Final Report for ADF Project 20010055

Gordon G. Rowland
Crop Development Centre
University of Saskatchewan

and

Eric Johnson
Agriculture and Agri-Food Canada
Scott Research Farm

December, 2002

Abstract/Executive Summary

The objective of this experiment was to see if an early flowering flax could be combined with late, after tillage, seeding for weed control in organic production. Nineteen experimental flax lines selected for early flowering, along with 5 check varieties, were seeded at two seeding dates, May 10 and June 4 at the Scott Experimental Farm. The severe drought experienced in 2002 masked any differences among entries in this experiment. Yields were only 10% of normal and no significant differences were found among entries or seeding time. However, the oil content, protein content and iodine value of the experimental lines were normal. Seed increase of all 19 lines was successful in preparation for future experiments.

Technical Report

As described in application 20010055, nineteen crosses were made at the Crop Development Centre (CDC) during the early winter of 1999-2000 among early flowering varieties identified from the Plant Gene Resources of Canada collection, early maturing Canadian selections and standard flax varieties. The F1's were raised in the College of Agriculture Phytotron during the spring of 2000 and the 19 F2 populations sown in June, 2000 at the Kernen Crop Research Farm (KCRF). Early flowering selections were made from each population and these selections were grown at the KCRF during the summer of 2001. As proposed, early flowering selections were made from each population and seed of these selections, along with the varieties CDC Bethune, CDC Arras and AC Watson, were increased at the Ceres Research Farm of Pyne Gould Guinness in Christchurch, New Zealand during the winter of 2001-2002. These plots were harvested and approximately 1 kg of seed of each was returned to the CDC in April of 2002.

The trial grown at the Scott Experimental Farm was a split-plot design with 4 replicates. The main plots were dates and the sub-plots were lines/varieties. The planting dates were May 10 and June 4. In addition to the lines/varieties listed above, Vimy and CDC Normandy were added to the experiment, making a total of 24 lines/varieties in the experiment. Other than pre-seeding tillage no weed control was used on the experiment. The drought of 2002 had a profound effect on this test and even the weeds did not establish or grow well. Emergence of all plots was normal but the drought masked any real differences among lines in time to flower by forcing lines to flower early. The highest average yield was only 206 kg/ha (Table 1). This is around 10% of a normal yield for flax at Scott. The coefficient of variation for yield was very high (32%), making the data very unreliable. There was really no difference in yield between the May 10 and June 4 seeding dates (Table 2). A few lines like entries 13 and 16 do seem to perform better at the later seeding date.

All 24 entries were increased in 18 m^2 plots at the KCRF. These plots were harvested (Table 3) and will provide seed for experiments in 2003. Quality analysis was also performed on this seed and showed that for oil, iodine value and protein, the 19 experimental lines were all within the range of standard Canadian varieties.

Therefore, in conclusion, the results for 2002 were very disappointing but they will provide some guidance for choosing which experimental lines should be used in future experiments involving this material. The fact that the experimental lines are within the normal quality range is encouraging.

Table 1. Average yield of the 24 flax entries at Scott SK in 2002

Entry	Line	Yield (kg/ha)
1	98EMS1403//CDC Normandy/92F54593	154
2	98EMS1403//FP961/F91109	156
3	98EMS1403//DEU2879	153
4	98EMS1403//CZE2927	154
5	CDC Normandy/92F54593//DEU2879	163
6	CDC Normandy/92F54593//CZE	160
7	FP961/F91109//DEU2879	171
8	FP961/F91109//CZE2927	195
9	CDC Arras/FP1048	181
10	CDC Arras/FP2004	145
11	CDC Valour/FP2004	175
12	CDC Valour/FP2041	178
13	FP1048/FP1050	201
14	FP1048/FP2041	150
15	FP1048/FP1077	206
16	CDC Bethune/FP1077	201
17	CDC Bethune/FP2041	165
18	CDC Arras/FP1077	174
19	FP1048/FP2004	171
20	CDC Bethune	155
21	CDC Arras	139
22	AC Watrous	149
23	Vimy	158
24	CDC Normandy	150

Table 2. Average yield for the two planting dates of the 24 flax entries at Scott SK in 2002

Entry	Line	Yield (kg/ha) May 10	Yield (kg/ha) June 4
1	98EMS1403//CDC Normandy/92F54593	168	140
2	98EMS1403//FP961/F91109	153	160
3	98EMS1403//DEU2879	148	158
4	98EMS1403//CZE2927	163	145
5	CDC Normandy/92F54593//DEU2879	178	148
6	CDC Normandy/92F54593//CZE	168	153
7	FP961/F91109//DEU2879	173	170
8	FP961/F91109//CZE2927	180	210
9	CDC Arras/FP1048	178	185
10	CDC Arras/FP2004	180	110
11	CDC Valour/FP2004	165	185
12	CDC Valour/FP2041	178	178
13	FP1048/FP1050	173	230
14	FP1048/FP2041	163	138
15	FP1048/FP1077	205	208
16	CDC Bethune/FP1077	183	220
17	CDC Bethune/FP2041	158	173
18	CDC Arras/FP1077	173	175
19	FP1048/FP2004	175	168
20	CDC Bethune	168	143
21	CDC Arras	135	143
22	AC Watrous	150	148
23	Vimy	155	160
24	CDC Normandy	150	150

Table 3. The total seed yield from increase plots of the 24 lines/varieties grown at Saskatoon in 2002 and the quality analysis of the seed.

Entry	Line	Yield (gms)	Oil (%)	Iodine value	Protein (%)
1	98EMS1403//CDC Normandy/92F54593	865	43.0	186	25.4
2	98EMS1403//FP961/F91109	1645	41.9	182	25.3
3	98EMS1403//DEU2879	1173	40.1	188	25.5
4	98EMS1403//CZE2927	1318	41.3	192	25.2
5	CDC Normandy/92F54593//DEU2879	723	40.8	189	24.9
6	CDC Normandy/92F54593//CZE	1152	40.4	189	24.5
7	FP961/F91109//DEU2879	990	42.7	188	25.6
8	FP961/F91109//CZE2927	1192	40.1	188	25.6
9	CDC Arras/FP1048	942	41.3	187	25.0
10	CDC Arras/FP2004	1129	42.7	191	25.4
11	CDC Valour/FP2004	1147	41.4	189	25.1
12	CDC Valour/FP2041	970	42.0	185	25.4
13	FP1048/FP1050	1227	42.1	186	24.4
14	FP1048/FP2041	1446	43.3	187	24.4
15	FP1048/FP1077	1466	41.8	187	24.7
16	CDC Bethune/FP1077	1704	41.7	185	24.5
17	CDC Bethune/FP2041	1510	42.1	188	24.0
18	CDC Arras/FP1077	1258	43.1	190	23.8
19	FP1048/FP2004	848	41.4	189	23.9
20	CDC Bethune	1183	41.8	185	24.7
21	CDC Arras	781	42.8	188	24.5
22	AC Watrous	1165	43.0	188	25.0
23	Vimy	1366	42.0	190	24.8
24	CDC Normandy	1043	40.4	185	25.2